AMENDMENT
(under provision of Section 11 of
LAW CONCERNING INTERNATIONAL APPLICATION, ETC.
PURSUANT TO THE PATENT COOPERATION TREATY)

To: Commissioner, Patent Office

1. Identification of the International Application:

   PCT/JP03/09585

2. Applicant

   Name: NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

   Address: 4-2-1, Nukui-Kitamachi, Koganei-shi, Tokyo 184-8795 Japan

   Nationality: JAPAN

   Domicile: JAPAN

3. Agent

   Name: OHKAWA Yuzuru, Patent Attorney (10866)

   Address: Kaimei Patent Office, Sankyo Central Plaza Building 5F, 11-8, Nishi-Nippori 5-chome, Arakawa-ku, Tokyo 116-0013 Japan

4. Items to be Amended:

   Claims

5. Nature of Amendment:

In claims 1, 2, 3, 4, 6, 7, 8, and 9, underlined portions of "a plurality of receiving circuits, each formed as a single constituent element by combining a <u>planar printed</u> small receiving antenna and a <u>micro</u> planar receiving circuit" are added.

6. List of Attachments

   (1) New sheets of Claims (pages 19 to 25)

CLAIMS

1. (amended) A millimeter-wave band radio communication method in which a receiver receives both an RF-band modulated signal transmitted from a transmitter and an un-modulated carrier also transmitted from the transmitter and having a phase noise characteristic coherent with that of the modulated signal, and generates a product of the two components to thereby restore an IF-band transmission source signal, the method comprising steps of:

disposing a plurality of receiving circuits, each formed as a single constituent element by combining a planar printed small receiving antenna and a micro planar receiving circuit, at intervals smaller than a wavelength corresponding to an IF band;

mixing detection outputs obtained through detection at the individual receiving circuits so as to output an IF-band composite output, which is then demodulated; and

before being mixed to obtain the IF-band composite output, making phase adjustment and amplitude weighting for the detection outputs from the individual receiving circuits.

2. (amended) A millimeter-wave band radio communication method in which a receiver receives both an RF-band modulated signal transmitted from a transmitter and an un-modulated carrier also transmitted from the transmitter and having a phase noise characteristic coherent with that of the modulated signal, and generates a product of the two components to thereby restore an IF-band transmission source

signal, the method comprising steps of:

disposing a plurality of receiving circuits, each formed as a single constituent element by combining a planar printed small receiving antenna and a micro planar receiving circuit, at intervals smaller than a wavelength corresponding to an IF band;

mixing detection outputs obtained through detection at the individual receiving circuits so as to output an IF-band composite output, which is then demodulated; and

disposing three or more of the receiving circuits at irregular intervals which differ from one another.

3. (amended) A millimeter-wave band radio communication method in which a receiver receives both an RF-band modulated signal transmitted from a transmitter and an un-modulated carrier also transmitted from the transmitter and having a phase noise characteristic coherent with that of the modulated signal, and generates a product of the two components to thereby restore an IF-band transmission source signal, the method steps of:

disposing a plurality of receiving circuits, each formed as a single constituent element by combining a planar printed small receiving antenna and a micro planar receiving circuit, at intervals smaller than a wavelength corresponding to an IF band;

mixing detection outputs obtained through detection at the individual receiving circuits so as to output an IF-band composite output, which is then demodulated; and

providing two or more substrates each carrying the receiving circuit, and changing the intervals between the substrates manually or automatically in accordance with the power of the IF-band composite output.

4. (amended) A millimeter-wave band radio communication method in which a receiver receives both an RF-band modulated signal transmitted from a transmitter and an un-modulated carrier also transmitted from the transmitter and having a phase noise characteristic coherent with that of the modulated signal, and generates a product of the two components to thereby restore an IF-band transmission source signal, the method comprising steps of:

disposing a plurality of receiving circuits, each formed as a single constituent element by combining a planar printed small receiving antenna and a micro planar receiving circuit, at intervals smaller than a wavelength corresponding to an IF band;

mixing detection outputs obtained through detection at the individual receiving circuits so as to output an IF-band composite output, which is then demodulated; and

arranging the individual receiving circuits two-dimensionally along longitudinal and transverse directions or three-dimensionally.

5. A millimeter-wave band radio communication method according to claim 4, wherein an antenna used in the transmitter is adapted to transmit circularly polarized waves, and about half the antennas used in the receiver are adapted

to receive horizontally polarized waves and the remaining antennas are adapted to receive vertically polarized waves.

6. (amended) A millimeter-wave band radio communication system in which a receiver receives both an RF-band modulated signal transmitted from a transmitter and an un-modulated carrier also transmitted from the transmitter and having a phase noise characteristic coherent with that of the modulated signal, and generates a product of the two components to thereby restore an IF-band transmission source signal, the system comprising:

a plurality of receiving circuits each formed as a single constituent element by combining a planar printed small receiving antenna and a micro planar receiving circuit, and disposed at intervals smaller than a wavelength corresponding to an IF band;

a detection output composing section for mixing detection outputs obtained through detection at the individual receiving circuits so as to output an IF-band composite output;

an IF signal demodulation section for receiving the IF-band composite output from the detection output composing section and for demodulating the IF-band composite output; and

a variable phase shifter and a variable attenuator for performing phase adjustment and amplitude weighting, respectively, for the detection output from each receiving circuit before mixing of the detection output at the

detection output composing section.

7. (amended) A millimeter-wave band radio communication system in which a receiver receives both an RF-band modulated signal transmitted from a transmitter and an un-modulated carrier also transmitted from the transmitter and having a phase noise characteristic coherent with that of the modulated signal, and generates a product of the two components to thereby restore an IF-band transmission source signal, the system comprising:

a plurality of receiving circuits each formed as a single constituent element by combining a <u>planar printed</u> small receiving antenna and a <u>micro</u> planar receiving circuit, and disposed at intervals smaller than a wavelength corresponding to an IF band;

a detection output composing section for mixing detection outputs obtained through detection at the individual receiving circuits so as to output an IF-band composite output; and

an IF signal demodulation section for receiving the IF-band composite output from the detection output composing section and for demodulating the IF-band composite output, wherein

three or more receiving circuits are provided and disposed at irregular intervals which differ from one another.

8. (amended) A millimeter-wave band radio communication system in which a receiver receives both an RF-band modulated signal transmitted from a transmitter and an un-modulated

carrier also transmitted from the transmitter and having a phase noise characteristic coherent with that of the modulated signal, and generates a product of the two components to thereby restore an IF-band transmission source signal, the system comprising:

a plurality of receiving circuits each formed as a single constituent element by combining a planar printed small receiving antenna and a micro planar receiving circuit, and disposed at intervals smaller than a wavelength corresponding to an IF band;

a detection output composing section for mixing detection outputs obtained through detection at the individual receiving circuits so as to output an IF-band composite output; and

an IF signal demodulation section for receiving the IF-band composite output from the detection output composing section and for demodulating the IF-band composite output, wherein

two or more substrates each carrying the receiving circuit are provided, and the intervals between the substrates are changed manually or automatically in accordance with the power of the IF-band composite output.

9. (amended) A millimeter-wave band radio communication system in which a receiver receives both an RF-band modulated signal transmitted from a transmitter and an un-modulated carrier also transmitted from the transmitter and having a phase noise characteristic coherent with that of the

modulated signal, and generates a product of the two components to thereby restore an IF-band transmission source signal, the system comprising:

a plurality of receiving circuits each formed as a single constituent element by combining a planar printed small receiving antenna and a micro planar receiving circuit, and disposed at intervals sufficiently smaller than a wavelength corresponding to an IF band;

a detection output composing section for mixing detection outputs from the individual receiving circuits so as to output an IF-band composite output; and

an IF signal demodulation section for receiving the IF-band composite output from the detection output composing section and for demodulating the IF-band composite output, wherein

the individual receiving circuits are arranged two-dimensionally along longitudinal and transverse directions or three-dimensionally.

10. A millimeter-wave band radio communication system according to claim 9, wherein an antenna used in the transmitter is adapted to transmit circularly polarized waves, and about half or a portion of the antennas of the receiving circuits of the receiver are adapted to receive first polarized waves and the remaining antennas are adapted to receive second polarized waves perpendicular to the first polarized waves.